REMARKS/ARGUMENTS

Reconsideration of the above-identified patent application is respectfully requested in view of the foregoing amendments and following remarks. Claims 1, 7, 12, and 18 have been amended. Claims 5, 6, 8 - 11, 15, 16, and 19 - 22 have been cancelled. Claims 1 - 4, 7, 12 - 14, and 17 - 18 remain in the application.

The above-identified patent application relates to a method of fabricating three-dimensional solid objects (e.g., a sink bowl, shower pan, etc.) from single-layer sheets of solid surface materials in single-part molds wherein an applied vacuum is the only force acting upon the solid surface material. The objects so formed have a seamless depression or projection capable of holding liquid and may simulate natural materials, such as stone, granite, or marble.

Claims 4, 5, 15, and 16 were objected to as being in an improper dependent form. Claims 4, 5, 15, and 16 have been cancelled, thereby overcoming the objection.

Claims 1 - 7 and 12 - 18 were rejected under 35 U.S.C. §112, second paragraph, as being indefinite. Applicants believe that the cancellation of claims 4, 5, 15, and 16 overcomes this rejection.

Claims 1, 2, 3, 12, 13, and 14 were rejected under 35 U.S.C. §102(b) as being anticipated by United States Patent No. 5,614,145 for METHOD AND APPARATUS FOR FORMING AN ARTICLE OF PET MATERIAL, issued March 25, 1997 to Pearse O'Kane. O'KANE teaches a vacuum forming method suitable for use with PET material.

Poly(ethylene terephthalate) (PET) is a semi-crystalline polymer widely used in different commercial applications such as textile fibers, films and bottles. Its final physical properties depend largely upon the degree of crystallization (i.e., the regular alignment of molecules of the polymer). A completely crystallized polymer would have substantially all

of its molecules in alignment, typically parallel one to another. The portion of the polymer having unaligned molecules, however, remains amorphous. The analogy between amorphous and crystallized polymers has been likened to a sock drawer in a dresser. Some people throw socks into a sock draw in one big tangled mess (i.e., an "amorphous" sock drawer) while others carefully fold the socks and stack them very neatly in parallel rows (i.e., a crystallized sock drawer. PET materials are particularly useful in relatively thin, flexible forms such as films and fabrics, one common use being for thin, flexible bottles for soda, water, and other such beverages.

In processing PET materials, for example by vacuum molding thin PET sheets as is the subject of the O'KANE reference, temperature and time are critical to achieving a desired degree of crystallization in the polymer. As already stated, the degree of crystallization determines the finished article's final physical properties, particularly the dimensional stability of the article as a function of temperature. In other words, the molding operation causes physical changes to the molecular structure of the material.

O'KANE teaches a method and apparatus for forming PET materials. Unlike Applicants' forming method, O'KANE requires that heat be applied to the mold. This is accomplished by pumping heated oil through "interconnected galleries" 12 connected via pipeline 11 to heated oil pump 10 and heater 13, all shown in O'KANE FIGURE 1. In addition, to ensure uniform crystallization of the PET sheets, radiant heaters 19 and 20 disposed above and below the PET sheet 3 are supported in support framework 14.

The operation of the O'KANE apparatus, as taught in the '145 patent is described in column 8, lines 1 - 49:

> "In use, the forming surface 7 of the mould 6 is brought up to the desired temperature, typically, 160° C. With the first and second radiant heaters 19 and 20 in the remote position, a PET sheet 3 to be formed is secured in the support framework 14. The radiant heaters

19 and 20 are moved into the heating position and direct heat to the first and second surfaces 4 and 5 of the sheet 3, thus raising the temperature of the surfaces 4 and 5 to a desired preforming temperature, typically 110° C. On the temperature of the surfaces 4 and 5 of the sheet 3 reaching the preforming temperature, the radiant heaters 19 and 20 are moved into the remote position and the mould 6 with its forming surface 7 at 160° C. is raised into engagement with the heated sheet 3 supported in the framework 14 as illustrated in FIG. 3.

A vacuum from the vacuum pump 8 is applied to the mould 6 to draw the heated sheet 3 onto the forming surface 7 of the mould 6, as illustrated in FIG. 3. The vacuum is held on the mould 6 and immediately on forming the PET sheet, the first radiant heater 19 is moved into the heating position for heating the second surface 5 of the formed sheet 3, see FIG. 4. The first surface 4 of the formed sheet 3 is heated to and maintained at a crystallising temperature of approximately 160° C. by heat transfer from the mould 6 while the formed sheet 3 is retained in the mould for increasing the degree of crystallisation of the formed sheet 3. The first radiant heater 19 heats and maintains the second surface 5 of the formed sheet 3 to a crystallising temperature substantially similar to the crystallising temperature of the first surface 4 while the vacuum is retained, and the formed sheet 3 is retained on the forming surface 7 of the mould 6. On the degree of crystallisation of the formed PET sheet 3 reaching the desired level of crystallisation, generally between 25% and 50%, the vacuum is released from the mould 6 and the first heating element 19 is moved into the remote location. The mould 6 is lowered and the formed article 2 is removed from the support framework 14.

In practice, the heater elements (not shown) of the first radiant heater 19 are controlled independently to vary the temperature profile and in turn the heat output profile from the first radiant heater 19 to accommodate the shape of the formed article 3 in the mould 6. For

> example, in the case of the article 3 illustrated in the drawings, which is of substantially channel shape, the heat output of the radiant heater elements (not shown) above the dished portion of the article would be adjusted to give a greater heat output than the radiant heater elements (not shown) at each end of the first radiant heater 19 to compensate for the greater distance of the dished portion of the article from the radiant heater elements (not shown) of the first radiant heater 19."

Applicants' apparatus and method differ significantly from those taught by O'KANE. First, Applicants' mold contains no source of heat (e.g., interconnected galleries through which heated oil is pumped).

Neither does Applicants' apparatus have external radiant heaters used either to preheat the material sheet prior to vacuum forming or to maintain a desired temperature on a second surface of the article being formed to facilitate proper crystallization of the material.

Applicants' mold apparatus is stationary in that it does not need to move toward or away from a material sheet. In Applicants' process, a preheated sheet of solid surface material is merely placed over the mold form and a retaining ring placed over the sheet prior to application of vacuum to the mold.

Neither must Applicants' preheated sheet of solid surface material be retained in a frame as must the PET sheet in the O'KANE process.

The huge differences in the apparatus and in the process steps involved in using each arise from their totally different uses. O'KANE teaches an apparatus for creating a controlled environment wherein the <u>MOLECULAR STRUCTURE</u> of the material being molded is changed. In contradistinction, Applicants' significantly simpler apparatus serves <u>ONLY TO CHANGE THE SHAPE</u> of a preheated sheet of solid surface material.

Applicants have amended claims 1 and 12 to recite that the mold includes neither injection molding capability nor an internal source of heat. These limitation are supported by the lack in Applicants' FIGURES and specification of either injection molding apparatus or any heat source in or near the mold. Applicants' description clearly states that a sheet of material is placed in an oven and heated to a predetermined temperature. The heated sheet is then vacuum formed. The oven is the ONLY source of heat used in Applicants' novel process. Likewise, no injection molding is required in Applicants' novel process. The recitation of no injection molding capability is believed necessary to define over prior art of record, specifically GRAEFE '770.

It is believed that these amendments overcome the rejection of claims 1, 2, 3, 12, and 13 under 35 U.S.C. §102(b) and being anticipated by O'KANE.

Claims 1 - 7 were rejected under 35 U.S.C. §103(a) as being unpatentable over O'KANE in view of United States Patent No. 6,083,339 for BOWLS COMPRISING ACRYLIC PLASTICS FILLED WITH ALUMINA TRIHYDRATE, AND PROCESSES FOR MAKING SAME, issued July 4, 2000 to Chris R. Peters et al. PETERS et al. teach a process for thermoforming sheets of solid surface material to form particular concavo-convex or other similar shapes. PETERS et al., however, exclusively use a two part mold (FIGURE 5) wherein a heated sheet of material is compressed between a male mold portion 48 and a female mold portion 46. Vacuum drawn through opening 60 in female mold portion 46 may be optionally applied: "Although to date we have not attempted such, because we have been so successful with the matched-mold rigid tool, it is believed that the male mold component might be assisted by way of drawing a vacuum in the female mold cavity" (Column 11, lines 57 - 60).

Applicants' method, on the other hand, uses ONLY a single part mold having a female cavity therein. A heated, single-layer sheet of solid surface material is placed over the mold cavity. As is shown in Applicants' FIGURES 2 and 6, the edges of the sheet may be restrained by a restraining ring 15 placed over the sheet of solid surface material 18a. Restraining

ring 15 is typically held in place by frame 17. The significant difference between Applicants' process and that taught and/or speculated by PETERS et al. is that substantially the ONLY force acting upon sheet 18a is the vacuum introduced into the mold cavity 12. This is completely different from the two-part mold method of PETERS et al. wherein a hydraulic ram or similar activator forces the male mold component into the sheet of material being deformed and, subsequently, the sheet is pressed into the female mold component.

As discussed hereinabove, there are vast differences in the O'KANE method compared to Applicants' process. Adding the teachings of PETERS et al. still fails to suggest Applicants' process. Also, there is no teaching in either O'KANE or PETERS et al. which suggests their combination.

Applicants have cancelled claims 4 and 5, making their rejection moot. Applicants believe that the amendment of claim 1 overcomes the rejection of claims 1 - 3 and 6 - 7 under 35 U.S.C. §103(a) as being unpatentable over O'KANE in view of PETERS et al.

Claims 6 - 7 were rejected under 35 U.S.C. §103(a) over O'KANE. The vast differences between Applicants' method and that taught by O'KANE have been fully explored hereinabove. The Examiner states that "it is well known in the art to connect a shower tray and water basin to another component. Thus it would have been obvious to one of ordinary skill in the art at the time that the invention was made to connect the article of O'Kane to another component in order to provide functionality and aesthetic appeal." Applicants believe that the differences in their process compared to O'KANE's are sufficient to overcome the rejection of claims 6 and 7 as being obvious over O'KANE. Applicants believe that the Examiner is obligated to substantiate any position expressed merely as an opinion. Because no such support was presented by the Examiner, he has, in Applicants' opinion, failed to establish a prima facie case of obviousness. Consequently, Applicants respectfully traverse the rejections of claims 6 and 7 under 35 U.S.C. §103(a) as being obvious over O'KANE.

Claims 12 - 18 were rejected under 35 U.S.C. §103(a) as being unpatentable over O'KANE in view of PETERS et al. Claims 15 and 16 have also been cancelled rendering their rejection moot. Based upon at least the reasons already stated hereinabove, Applicants respectfully traverse the rejection of claims 12 - 14 and 17 - 18 under 35 U.S.C. §103(a) as being unpatentable over O'KANE in view of PETERS et al.

Claims 15 and 16 were rejected under 35 U.S.C. §103(a) as being unpatentable over O'KANE. Claims 15 and 16 have been cancelled thereby rendering their rejection moot.

In view of the foregoing amendments and remarks, Applicants respectfully request that claims 1 - 4, 7, 12 - 14, and 17 - 18 be allowed and the application be passed to issue.

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